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Group Art Unit: 2815

REMARKS

Claim Rejections - 35 USC §103

Claims 1-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art (hereinafter "AAPA"), as disclosed in figures 1A-1B, and the description on Pages 1-2 of the instant application, in view of Ikenaga et al. (U.S. Patent No. 6,744,118, hereinafter "Ikenaga").

With regard to claims 1, 7, and 13, the independent claims have been clarified to amend the previously claimed combinations, as exemplified in claim 1, to now include the limitation that:

"a solder metal layer is formed on the surface of the indentation of the dam bar structure of the lead frame."

The support is found at page 6, line 19 to page 7, line 2; page 7, lines 5-11; page 8, lines 10-13; and page 9, lines 8-18. Further, support for claims 1, 7, and 13 was previously in respective claims 4, 10, and 16, which have been cancelled.

The present invention is directed to a surface-mount-enhanced lead frame, a semiconductor package with the lead frame, and a method for fabricating the semiconductor package. A dam bar structure formed with an indentation is connected to an end of each of the leads away from the die pad of the lead frame, and a metal solder layer is formed on a bottom side of the lead frame and a surface of the indentation. The indentation and the metal solder layer provide good wettability and larger solder area to allow the lead frame to be effectively soldered to an external device (such as printed circuit board) by the surface mount technology (SMT), such that the surface-mount effect of the semiconductor package is enhanced without increasing the circumstances of the semiconductor package area.

As stated on page 2 of the Office Action regarding AAPA, "Applicant's admitted prior art fails to disclose a dam bar structure formed with an indentation that is integrally formed to be connected to each end of the leads away from the die pad".

Ikenaga teaches groove portions 12 formed on the lead frame corresponding to grid-leads L. In Ikenaga column 4, lines 4-24, the groove portions can be defined from the front or back of the grid-leads. When a width of the groove portions is larger than a width of the

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dicing saw, the generation of burrs is lessened and accidental short-circuiting is prevented. When a width of the groove portions is smaller than a width of the dicing saw, the generation of metal powder and dust is inhibited, the time required for cutting becomes shorter and damage to the dicing saw is lessened.

On the contrary, the dam bar structure with the indentation in the present invention is used to provide good wettability and increase solder area for enhancing the surface-mount effect so as to effectively solder the lead frame to the external device by SMT, such that the problems caused by separation of solder joints and solder openings in the conventional technology are greatly reduced. The purposes and effects of the indentation in the present invention are different from the groove portions in Ikenaga et al.

Moreover, there is no teaching or suggestion in Ikenaga et al. or Applicant's admitted prior art that "a metal solder layer is formed on a surface of the indentation of the dam bar structure to enhance the surface-mount effect".

Based on the above, it is respectfully submitted that claims 1, 7, and 13, are allowable under 35 U.S.C. §103(a) as being patentable over AAPA in view of Ikenaga because:

"[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." [underlining for clarity] *In re Vaack*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

With regard to claims 2-6, 8-12, and 14-20, these dependent claims respectively depend from independent claims 1, 7, and 13, and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations thereof.

Based on all of the above, it is respectfully submitted that claims 1-20 are allowable under 35 U.S.C. §103(a) as being patentable over AAPA in view of Ikenaga.

Other

Claim 14 has been amended to correct a typographical error. A space has been inserted between "claim" and "13".

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The other references cited by the Examiner showing the prior art have been considered and are not believed to disclose, teach, or suggest, either singularly or in combination, Applicants' invention as claimed.

Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 1-20 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



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